

REMARKS

Claims 1-16 are pending in the application. Claims 4-6 and 12-14 have been previously withdrawn, and claims 1-3, 7-11, 15 and 16 stand rejected. No new matter has been introduced by this amendment.

1. Preliminary Matters

Please note that applicant submits herewith a document designated as "C7 – Copy of Examination Report issued on February 10, 2006 for corresponding British Patent Application No. 0600037.6 listed in Form PTO-1449 of the IDS submitted April 27, 2006. The Examiner indicates in the Office Action that this document was not previously received. If any additional fee is due, such fee may be charged to the deposit account listed on the transmittal letter accompanying this amendment.

Applicant plans to file a terminal disclaimer under 37 C.F.R. § 1.321(b) to overcome the Examiner's obviousness-type double patenting rejection based upon co-pending Application Serial Nos. 10/823,473 and 10/823,484, upon an indication of allowable subject matter.

2. Remarks Regarding The Specification

The specification has been amended to include reference numbers 133a, 133b, and 133c shown in Fig. 21 along with an explanation of such reference numbers. No new matter has been added.

3. Claim Rejection under 35 U.S.C. § 102 (b)

A. Nakatani (U.S. Patent No. 5,390,061)

Claims 1, 2, 7, 9, 10 and 15 stand rejected under 35 U.S.C. § 102 (b) as being anticipated by Nakatani. Applicant respectfully traverses this rejection. Independent claims 1 and 9 have been amended to recite that the giant magnetoresistive (GMR) element includes a group of adjacent parallel layers. The group is defined as including a pinned magnetic layer, a free magnetic layer, and a nonmagnetic layer disposed between the pinned magnetic layer and the free magnetic layer. The independent claims have been further amended to recite that

the group of adjacent layers is free of an antiferromagnetic layer parallel to any layers of the group. That is, no antiferromagnetic layer exists within the GMR group. Eliminating the antiferromagnetic layer from the group permits a narrower reproduction shield distance and decreased noise due to the AMR effect of shield layers and Joule heat (specification, page 4, lines 12-16).

With respect to the embodiment of Fig. 4, in the CPP-GMR head 1, the magnetization direction of the pinned magnetic layer is stabilized in the height direction by (a) the shape anisotropy, (b) the inverse magnetoresistive effect and (c) the seed effect of the lower large-area nonmagnetic metal film 20, all without providing an antiferromagnetic layer for pinning the magnetization direction of the pinned magnetic layer 31. Therefore, when the sensing current flows through the GMR element 30, the generated Joule heat is significantly decreased to suppress an increase in the element temperature. This improves reliability and the high-frequency characteristics of the head. Also, because the antiferromagnetic layer has been eliminated in the parallel layers, the shield distance R-GL can be decreased, and the upper and lower large-area nonmagnetic metal films 20 and 40 can be formed to larger thicknesses, compared with a conventional head (specification, page 22, line 21 to page 23, line 15).

In contrast, Nakatani requires use of an antiferromagnetic layer 35, which is about 50 nm thick (Col. 13, lines 43-45). In Nakatani, the antiferromagnetic layer is formed on the upper magnetic layer or the lower magnetic layer (Col. 15, lines 10-15). The cited reference discloses that the antiferromagnetic layer may be formed of Fe-50 at % Mn alloy. Col. 15, lines 32-33. Clearly, the structure in Nakatani is NOT free of an antiferromagnetic layer in the layers forming the GMR effect element. The feature of being FREE of an antiferromagnetic layer in the GMR effect element is completely missing in Nakatani, which requires use of such a layer. Because at least one significant element of applicant's claimed invention is missing from the structure in Nakatani, Nakatani cannot anticipate applicant's claimed invention. Accordingly, applicant asserts that independent claims 1 and 9 are allowable over

Nakatani, and that claims depending from claims 1 and 9, respectively are allowable as depending from allowable base claims.

B. Dill (U.S. Patent No. 5,898,548)

Claim 9 stands rejected under 35 U.S.C. § 102 (b) as being anticipated by Dill. Applicant respectfully traverses this rejection. As set forth above, independent claim 9 has been amended to recite that the giant magnetoresistive (GMR) element includes a specific group of parallel layers that is free of an antiferromagnetic layer. That is, no antiferromagnetic layer is required in the GMR group in applicant's claimed GMR structure.

In contrast, the structure in Dill utilizes an antiferromagnetic layer 116 on the template layer 112 (Col. 5, lines 38-42), which is part of the GMR structure. The ferromagnetic layer 112 enhances growth of the antiferromagnetic layer 116 (Col. 5, lines 38-42). The antiferromagnetic layer is discussed throughout the reference specification (Col. 5, lines 62-64; Col. 6, lines 32-34; Col. 9, line 35; Col. 10, line 33).

The element of being FREE of an antiferromagnetic layer in the parallel layers of the GMR element is missing in Dill, which requires use of such a layer. Because at least one significant element of applicant's claimed invention is missing from the structure in Dill, Dill cannot anticipate applicant's claimed invention. Accordingly, applicant asserts that independent claim 9 is allowable over Dill.

C. Saito (U.S. Patent Publication No. 2003/1013299)

Claims 9 and 11 stand rejected under 35 U.S.C. § 102 (a) as being anticipated by Saito. Applicant respectfully traverses this rejection. As set forth above, independent claim 9 has been amended to recite that the giant magnetoresistive (GMR) element is free of an antiferromagnetic layer in the group of parallel layers. That is, no antiferromagnetic layer is required in the GMR structure.

Like Nakatani and Dill, Saito utilizes an antiferromagnetic layer in the GMR structure. This is discussed throughout the reference specification (para [0020]; para [0023]; para [0030]; para [0031]; para [0103]; para [0129] etc. For the same

reasons as set forth above, applicant asserts that Saito cannot anticipate applicant's claimed invention. Accordingly, applicant asserts that independent claim 9 is allowable over Saito, and that claim 11 depending from claim 9 is allowable as depending from an allowable base claim.

D. Carey (U.S. Patent No. 6,757,144)

Claim 1 stands rejected under 35 U.S.C. § 102 (b) as being anticipated by Carey. Applicant respectfully traverses this rejection. As set forth above, independent claim 1 has been amended to recite that the giant magnetoresistive (GMR) element is free of an antiferromagnetic layer in the parallel layers of the group that define the GMR element. That is, no antiferromagnetic layer is required in the GMR structure.

Like Nakatani, Dill, and Saito, Carey utilizes an antiferromagnetic layer. This is discussed throughout the reference specification (Col. 2, lines 60-62; Col. 6, lines 37-42; Col. 6, line 66; Col. 7, lines 50-52; Col. 8, lines 35-40, etc.). For the same reasons as set forth above, applicant asserts that Carey cannot anticipate applicant's claimed invention. Accordingly, applicant asserts that independent claim 1 is allowable over Carey.

4. Claim Rejection under 35 U.S.C. § 103 (a)

Claims 3, 8, 11, and 16 stand rejected as being unpatentable over Nakatani 5,390,061. In view of the claims as presently amended, applicant respectfully traverses this rejection.

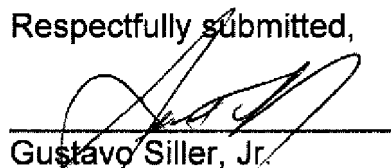
Applicant asserts the above arguments set forth regarding the rejection under § 102 and reiterates that Nakatani requires use of an antiferromagnetic layer 35 in the parallel layers of the GMR element, which is about 50 nm thick (Col. 13, lines 43-45). In Nakatani, the antiferromagnetic layer is formed on the upper magnetic layer or the lower magnetic layer (Col. 15, lines 10-15). Applicant submits that Nakatani does not teach or suggest applicant's claimed invention, which is free from the antiferromagnetic layer in the group of parallel layers defining the GMR element. Nakatani teaches away from applicant's claimed invention by utilizing the

antiferromagnetic layer in the reference structure. Accordingly, applicant respectfully submits that the claimed invention is not unpatentable over the cited combination.

5. Conclusion

Based on the above remarks, the applicant respectfully submits that the claims are in condition for allowance. The examiner is kindly invited to contact the undersigned attorney to expedite allowance.

Respectfully submitted,



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